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(Continued from the January issue)

A REVISION OF NORTH AMERICAN OMPHRALIDAE (Scenopinidae)

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Omphralosoma albifasciata n. sp.
(fig. 5a)

This species more nearly resembles **Omphrale mirabilis** (Adams) than any other American species of Omphralidae. It is readily distinguished from this by the vestiture of the thorax, by the short vein R_5, by its smaller size and shorter abdomen of the female and by the broader white bands of male abdomen.

Male.—Chiefly polished black species, sparsely covered with scales on the thorax and with short yellow hairs on the abdomen and legs. **Head:** Almost hemispherical, higher than long from side view. Eyes divided into two portions by a differentiation in the size and color of the facets, on the lower one-third the facets are smaller in size and darker in color. Front polished black, eyes very narrowly separated, front extending to the ocellar triangle as just a thin line. Face shining black in ground color, covered with gray pubescene. Antennae brownish black, third segment about twice as long as first two, slender, not swollen, apex square (fig. 5a). Mouthparts black with a brown tinge. Sides of face sloped, mouthparts well developed, filling most of facial depression. Palpi slender, extending almost to the tip of labellum. **Thorax:** scales white, confined largely to the mesonotum. Knobs of halteres ivory-white, posterior edge of humeri faintly yellowish tinged, otherwise black. **Legs:** Coxae, trochanters and femora black, tibiae and tarsi yellow; extreme apices of femora often yellowish. **Wings:** Milky white, veins faintly yellowed, just slightly darker than the membrane. Vein R_5 scarcely longer than R_4, and very faintly curved. Apical cell (cell R_5) rather widely open in the wing margin, the opening is about equal to the length of r-m crossvein. Crossvein r-m situated about twice its length from fork of M_1 and M_2. **Abdomen:** Shining black, except for the ivory-white terga of segments three, four and five; these terga are entirely white except for very small triangles of black on lateral margins. **Genitalia:** Small and rather inconspicuous. Ninth tergum well developed, divided into two broad lateral plates; these plates extend around the genital structures to the venter; they are about two times as wide as long and are more produced on their dorsal and ventral edges. Cerci elongated, over two times

as long as wide. Coxopodite and clasping structures chiefly hidden by the overlapping ninth tergum. Claspers rather small and simple, strongly curved inwardly on apical portion.

Length: body, 2.3 mm.; wing, 1.7 mm.

Female.—Similar to male but the front is about twice as wide as the ocellar triangle, the tibiae are chiefly black, the wing veins are more brown, R_5 is slightly longer and the abdomen is without the white bands.

Length: body, 2.66 mm.; wing, 2.0 mm.

Holotype, male, Seeley, Calif., July 17, 1940 (R. H. Beamer). Allotype, female, Jacumba, Calif., Aug. 12, 1935 (R. H. Beamer). One paratype, male, same data as type.

Omphrale Meigen

Omphrale Meigen, 1800, Nouvelle Classif., p. 29.

The member of this genus are robust in build, chiefly black in color and have the apical cell open in the wing margin, vein R_5 not joined with M_{1+2}. The third antennal segment is rather elongate, three to four times longer than wide, is rounded at tip and has a subapical depression on outer side. The head is higher than long and the front gradually sloped. The mouthparts are well developed, occupying most of the facial depression and the palpi extend nearly to tip of labellum. The abdomen is flat and board, scarcely longer than the head and thorax combined.

Genotype, **Omphrale fenestralis** (Linnaeus)

Key to North American Species of **Omphrale**

1. Eyes of male separated on the front by almost the width of the median ocellus, front of both sexes smooth and polished ..... (**Paraomphrale**) **glabrifrons** (Meigen)
   Eyes of male contiguous, or nearly so; front finely rugulose and usually more dull. (**Omphrale**) 2
2. Femora reddish 3
   Femora black 4
3. Front with a distinct median depression on the lower part ..... **cavifrons** Kröber
   Front without such a depression but with a longitudinal furrow ..... **fenestralis** (Linn.)
4. Knobs of halteres white 7
   Knobs brown to black 5
5. Abdominal terga of male three to five very broad, revealing just a narrow white band of conjunctiva; the terga are three to four times wider than the white bands ..... **valga** n. sp.
   Terga of segments three to five very narrow, these segments are almost entirely white 6
6. Wing veins brown (male) ..... **nubilipes** (Say)
   Wing veins hyaline ..... **beameri fusca** n. var.
7. Third antennal segment four times as long as wide; antennae about as long as head width ..... **electa** (Adams)

Third antennal segment not over three times as long as wide; antennae about one half the head width 8

8. Apical cell widely open in the wing margin, almost as wide at apex as at its widest point, apex about equal to width of r-m crossvein; portion of vein M_{1+2} from the crossvein to the r-m crossvein equal in length to the r-m crossvein ..... **ramaleyi** (James)
Apical cell noticeably narrowed, apex scarcely half its greatest width and less than width of r-m crossvein; that portion of M_{1+2} from m to r-m much longer than r-m 9

9. Wing veins of male hyaline, ninth tergum without a pair of ventral lobes; cleft of tergum 'V' shaped 10
Wing veins brown; plates of ninth tergum each with a pair of strong median lobes; cleft of tergum narrowly U shaped ..... **kuiterti** n. sp.

10. Plates of the ninth tergum of male as long on ventral margins as on dorsal ..... **beameri** n. sp.
Tergum strongly developed on upper portion, length of dorsal margin twice that of the ventral ..... **mirabilis** (Adams)

Omphrale beameri n. sp.
(fig. 6a)

This species fits very closely the description given for **O. mirabilis** (Adams), the male genital structures, however, are very different. It is distinguished by the strong development of the ventral portion of the ninth tergum. The halteres are white to yellowish in the typical form.

Male genitalia: Ninth tergum broad, divided into a pair of lateral plates which fold around the genital structures. The cleft on the ventral portion is 'V' shaped, the posterior margins of the plate are simple, not lobate. Cerci two times as long as greatest width. The clasping structures are almost median in position and extend vertically (fig. 6a). Aedeagus rather simple, with two small, scarcely visible lateral prongs.

Length: body, 2.3-2.5 mm.; wing, 2-2.3 mm.

Female: Not separable from **O. mirabilis.**

Holotype, male, Olancha, Calif., Aug. 25, 1940 (R. H. Beamer). Allotype, female and twenty-seven paratypes, twenty males, seven females from following localities: same locality and data as holotype (R. H. Beamer, D. E. Hardy, E. E. Kenaga); Bishop, Calif., July 28, 1940 (R. H. Beamer); Lone Pine, Calif., July 28, 1940 (R. H. Beamer); Pinedale, Calif., July 22, 1940 (D. E. Hardy) and Fallon, Nevada, Aug. 12, 1940 (R. H. Beamer). All in Snow Entomological Collections.

Omphrale beameri fusca n. var.

This apparently differs from typical **beameri** only by having the halteres chiefly brownish or black, only obscurely whitened.

This western form has been previously determined as **O. nubilipes** (Say) but until that species has been recognized it is perhaps better to consider them distinct.

Holotype male, Onyx, Calif., July 23, 1940 (R. H. Beamer). Allotype female and twenty-three, paratypes, twelve males, thirteen females from following: same data as type (R. H. Beamer, D. E. Hardy); San Jacinto Mts., Calif., July 21, 1929 (L. D. Anderson); Antioch, Calif., July 20, 1935 (R. H. Beamer); Seeley, Calif., July 17, 1940 (R. H. Beamer); Kernville, Calif., July 24, 1940 (R. H. Beamer); Ione, Calif., Aug. 9, 1940 (R. H. Beamer); Laguna Mts., Calif., July 6, 1929 (R. H. Beamer); Lone Pine, Calif., July 28, 1940 (R. H. Beamer) and Dixie, Ore., July 8, 1931 (R. H. Beamer).

All in Snow Entomological Collections.

Omphrale cavifrons Kröber

Omphrale cavifrons Kröber, 1937, Stett. Ento. Zeit., 95, 231.

This species appears very close to **O. fenestralis** (Linn.) apparently differing only by having a median depression on the lower part of the front; it is also slightly smaller in size. The writer would question its validity, in a large series of female specimens of **O. fenestralis** individuals have been observed with the lower portion of front flat to slightly depressed. Kröber allies this species with **senilis** (F.) and states that it is possibly just a variety of this.

Length: body, 4.1 mm.; wing, 3.7 mm.

Described from one female, Joinville, Algonquin.

Type in Hamburg.

Omphrale electa (Adams)
(figs. 7a, b)

Scenopinus electa Adams, 1904, Kans. Univ. Sci. Bull., 445-446.

This species is recognized by its elongate third antennal segment (fig. 7a), this is four times as long as wide, it is nearly three times as long as first two combined; the entire antenna is about equal in length to the head width. Chiefly black species, except for a yellowish brown spot on each side of the lower face, brownish yellow antennae and palpi, white knobs of halteres. white hind margins of abdominal segments three to five and yellowish tibiae and tarsi; the humeri, posterior calli and pteropleurae are also faintly yellowed. The mouthparts are well developed, filling most of the facial depression and the palpi are flattened apically and extend to about apex of labellum. The apical cell is strongly narrowed, the apex being much less than the length of r-m crossvein. Vein R_5 about three fourths the length of the R_{4+5} section. That portion of vein M_{1+2} between the m crossvein and the r-m is twice as long as the r-m. **Male genitalia:** Ninth tergum divided into two broad plates, these extend all of the way around the genital structures and serve as a protective covering; the ventral portion of each lateral plate is developed into a rounded lobe at apex (fig. 7b). Clasping structures simple, the coxopodite and claspers are almost completely hidden by the folding around of the tergum. Cerci about three times as long as wide, rounded at apices.

Length: 2.5 mm.
Type locality, Bill Williams Fork, Arizona.
Type in Snow Entomological Collections.

Omphrale fenestralis (Linnaeus)

Musca fenestralis Linnaeus, 1845, Fauna Suec.

This common species is almost world wide in distribution. It is readily recognized by its relatively large size, reddish legs, rugulose front and very narrowly separated eyes of the male. Chiefly black species, front of female with a distinct longitudinal median furrow, front of female much wider than ocellar triangle. Occiput rather swollen on upper portion, extending slightly higher than the eye margin. Antennae brownish black, third segment slightly more than three times longer than wide, with a subapical depression on outside margin. Mouthparts well developed filling most of the facial depression; palpi flattened on outer portions, distinctly haired, extending almost to tip of labellum. Dorsum of thorax finely rugulose, thickly covered with short recumbent pile. Margins of humeri, posterior calli and portions of pteropleurae yellowish. Knobs of halteres brownish above, white below. **Legs:** yellowish-red, tarsi brownish. Apical cell of wings widely open, the apex almost equal to width of r-m crossvein. Vein R_5 much longer than that portion of R_{4+5} from r-m crossvein to the fork. That portion of M_{1+2} between r-m and m crossveins equal to twice the length of the r-m. **Abdomen:** brownish black.

Length, 4.0-6.0 mm.
Described from Europe.
Type probably lost.

This species is very common, usually being taken upon the inside of windows. The larvae are predaceous upon capret beetles.

Omphrale (Paraomphrale) glabrifrons (Meigen)

Scenopinus glabifrons Meigen, 1824, Syst. Beschr., 4, 114.

This species has been used by Kröber[4] as the genotype of a proposed new genus, **Paraomphrale**. This was separated from **Omphrale** by having the eyes of the male distinctly separated on the front, front almost equal to the width of the median ocellus and by having the front smooth and polished. This writer prefers to treat this as a subgenus, the above characters alone appear somewhat variable and do not seem to represent good generic differences.

The species is very similar to **O. fenestralis**, it is readily distinguished by the smooth and polished front, entirely white halteres and slightly smaller size.

Length: 4.0-5.0 mm.
Described from Europe.
Type probably lost.

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4 1937, Stett. Ento. Zeit, 98, 222.

This species is very widely distributed; it has been recorded from many localities in America, Europe, North Africa and Australia.

Omphrale kuiterti n. sp.
(fig. 8a)

This species is related to **O. mirabilis** (Adams). It is readily distinguished by the strongly developed median lobes of the male ninth tergum, the brown wing veins, narrower apical cell and slightly larger size.

Male.—Almost entirely black species. **Head:** Facets of lower one-third of compound eyes very small compared to those of upper two-thirds. Eyes very narrowly separated on the front, much less than the width of the median ocellus; front polished and smooth in median portion below, finely rugulose and sub-shining above and along eye margins. Sides of face chiefly vertical, only a very narrow rim next to the eye margins. Mouthparts well developed, filling most of the facial depression. Palpi broad and flat, extending nearly to apex of labellum. Occiput concave, very poorly developed. Lower portion of face with fine white pile. Third segments of antennae three times as long as greatest width, with a subapical depression on outside; brownish black in color, with microscopic gray pubescence. **Thorax:** Shining black in ground color, finely rugulose, mesonotum and scutellum somewhat grayed due to the moderately thick covering of short recumbent white pile. Humeri with a faint brownish spot on hind portion. Margins of posterior calli yellowish. Stems of halteres brown, knobs white. Thorax scarcely longer than high. **Legs:** Apices of femora and first two to three subsegments of tarsi yellowish, otherwise dark brown to black. All hairs white. Basitarsi slightly longer than next three subsegments. **Wings:** Costa ending just before apex, apical cell very narrowly open, the apex is equal to about one-fifth the greatest width of the cell. The free portion of R_5 is about three-fourths the length of that section of R_{4+5} between the r-m crossvein and the fork. Crossvein r-m situated at apical two-thirds of discal cell. **Abdomen:** Shining, chiefly brownish to black, the terga of segments three to five strongly narrowed, exposing the white conjunctiva. **Genitalia:** Ninth tergum well developed and extending around the genital structures; much longer, not so broad as in related species. The ventral portions which extend over the coxopodite are developed into a long slender lobe at each of their apices (fig. 8a). The tergum is scarcely divided into two plates on the ventral surface, with a narrowly U shaped cleft between these. Cerci about two times longer than wide. Coxopodite wider than long, divided into a pair of short lobes apically, these with a U shaped cleft between. Aedeagus two branched, these are long slender and very conspicuous. Clasping structures simple, strongly curved inward.

Length: body, 3.0 mm.; wing, 2.4 mm.

Female unknown.

Holotype male, Buckeye, Arizona, July 16, 1940 (L. C. Kuitert). One

paratype male, Black Mountain, Arizona, July 13, 1932 (R. H. Beamer). Both in Snow Entomological Collections.

The writer takes pleasure in naming this species after Mr. L. C. Kuitert.

Omphrale mirabilis (Adams)
(fig. 9a)

Scenopinus mirabilis Adams, 1904, Kans. Univ. Sci. Bull., 2, 445.

This small species is best distinguished by its chiefly black color, white knobs of halteres, pale wing veins of the male and the strongly produced ninth tergum. It has been known only from the type female, the association of the male is not at all certain. The specimens described below appear to be conspecific with the holotype.

Male.—Head: Eyes very narrowly separated on the front. Front shining, finely rugulose on the sides and with a faint longitudinal median furrow. Facets of lower third of compound eyes very small compared to the upper two-thirds. Antennae brownish black, third segment about three times longer than wide, situated well below middle of the eyes. Mouthparts filling most of facial depression, palpi hairy and slender, slightly flattened toward apices. Lower portion of face and occiput sparsely haired. Occiput weak, somewhat concave on upper portion. **Thorax:** Shining black in ground color, finely rugulose. Mesonotum and scutellum faintly pollinose and with sparse, white pubescent pile. **Legs:** Almost entirely black, tarsi yellowish. Basitarsi equal to next three subsegments in length. **Wings:** Hyaline, ceins very slightly yellowed, chiefly concolorous with the membrane. Costa ends at about the wing apex. Crossvein r-m situated at apical two-thirds of discal cell. Apical cell is not so noticeably narrowed as in **O. kuiterti**, the apex being slightly shorter than or about equal to the r-m crossvein. Vein R_5 about two-thirds the length of the portion of R_{4+5} between r-m and the furcation. That portion of M_{1+2} between the r-m and m crossvein about twice as long as r-m. **Abdomen:** Chiefly polished black, covered with fine pale pile. Terga of segments three to five very narrow revealing the pure white conjunctiva. **Genitalia:** Ninth tergum folded around the genitalia and rather strongly developed on the upper portion; the length of the upper edge of each plate (that which extends over the coxopodite) is twice that of the lower edge (that extending above anal region). The posterior elongations of each plate are broad, somewhat rounding at their apices and have a distinct notch near outer edges (fig. 9a). The cerci are broad and rather short, not much longer than greatest width. The coxopodite is as wide as long, the posterior margin is tapered into a slender median lobe, this has a V shaped cleft at its apex. Clasping structures thick, curved inward. Aedeagus divided into three short prongs at apex.

Length: Body, 2.3-2.5 mm.; wings, 2-2.3 mm.

Female.—Of larger size; front much wider than ocellar triangle, finely rugulose and with a distinct longitudinal furrow. Abdomen entirely brownish black.

Length: Body, 3.4-4 mm.; wings, 2.5 mm.

Type locality, Bill Williams Fork, Arizona.

Type in Snow Entomological Collections.

The writer has identified this species from the following localities: Baboquivari Mts., Arizona, July 24, 1941 (L. H. Banker); Turkey Creek, Arizona, June 10, 1933 (R. H. Beamer); Milagro, New Mexico and Las Cruces, N. M., July 3, 1940 (R. H. Beamer).

The specimens from Alamogordo, New Mexico, described by Cresson[5] as **Scenopinus nubilipes** Say possibly belong here.

Omphrale nubilipes (Say)

Scenopinus nubilipes Say, 1828, Jour. Phil. Acad. Sci., 6, 170.

This species is recognized by its brownish to black halteres, small size and chiefly black body and appendages. In general it resembles **O. mirabilis** (Adams).

This species is not clearly differentiated and until the male genitalia of specimens from near the type locality can be studied its determination is questionable. It is supposed to be characterized by having black halteres and brown wing veins, there are other species concerned which have varying amounts of brown to black on the halteres.

Length: 2.0-4.0 mm.

Type locality, Indiana.

Type probably lost.

The writer has not seen this species although it was formerly considered one of the most common members of the family. Probably most of the western records that are in the literature should actually pertain to some other species.

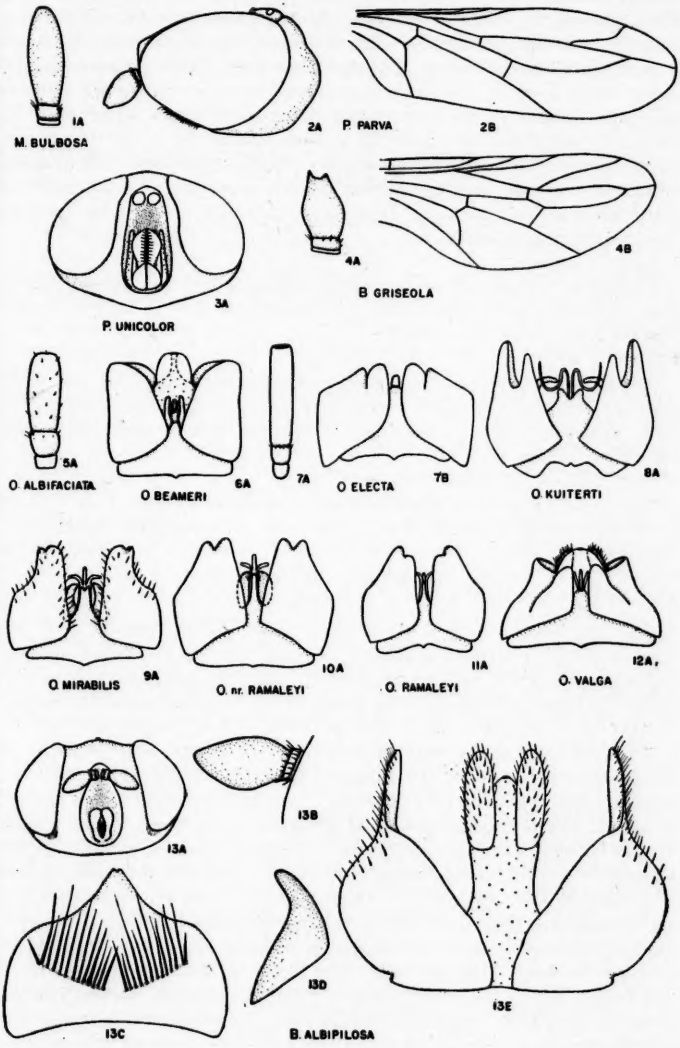
Omphrale ramaleyi (James)
(fig. 11a.)

Scenopinus ramaleyi James, 1938, Jour. Kans. Ent. Soc., 11, 22-23.

5 1907, Trans. Am. Ent. Soc., 33, 111.

EXPLANATION OF PLATE

Fig. 1. **Metatrichia bulbosa** Osten Sacken, a. antenna.
Fig. 2. **Pseudatrichia parva** n. sp., a. head, lateral; b. wing.
Fig. 3. **P. unicolor** Coquillett, a head, facial view.
Fig. 4. **Brevitrichia griseola** (Cokuillett), a. antenna; b. wing.
Fig. 5. **Omphralosoma albifasciata** n. sp., a. antenna.
Fig. 6. **Omphrale beameri** n. sp., a. male genitalia, dorsal.
Fig. 7. **O electa** (Adams), a. antenna; b. male genitalia, dorsal.
Fig. 8. **O. kuiterti** n. sp., a. male genitalia, dorsal.
Fig. 9. **O. mirabilis** (Adams), a. male genitalia, dorsal.
Fig. 10. **O. nr. ramaleyi** n. sp., a. male genitalia, dorsal.
Fig. 11. **O. ramaleyi** (James), a. male genitalia, dorsal.
Fig. 12. **O. valga** n. sp., a. male genitalia, dorsal.
Fig. 13. **Belosta albipilosa** n. sp., a. head, facial view; b. antenna; c. coxopodite of male; d. left clasper of male; e. ninth tergum, cerci and anal region of male.


1A
M. BULBOSA
2A
P. PARVA
2B
3A
P. UNICOLOR
4A
B. GRISEOLA
4B
5A
O. ALBIFACIATA
O. BEAMERI
6A
7A
O. ELECTA
7B
O. KUITERTI
8A
9A
O. MIRABILIS
O. nr. RAMALEYI
10A
O. RAMALEYI
11A
O. VALGA
12A
13A
13B
13C
13D
B. ALBIPILOSA
13E

This species is very close to that interpreted by this writer as **O. mirabilis** (Adams). It is distinguished by having the apical cell more broad, scarcely narrowed, the veins of wings brownish. The plates of ninth tergum of male each have a distinct notch near apex of dorsal margin (fig. 11a) (those margins which fold over coxopodite) but these lobes are of about equal size instead of the inner lobes being many times larger than the outer as in **mirabilis**. The posterior median lobe of the coxopodite is very slender, scarcely wider than the median prong of aedeagus. The clasping structures are more strongly curved than in **mirabilis** and the cerci are nearly twice as long as wide. In other respects the specimen at hand fits the description of **mirabilis**.

Length: 2.0 mm.

Female.—The front broad and finely rugulose, abdomen wholly shining black and knobs of halteres with a considerable amount of brown on them. Slightly larger than the male.

Length: 2.5 mm.

A male specimen is on hand from Lusk, Wyoming, July 14, 1937 (C. L. Johnson) which fits **ramaleyi** except that the plates of ninth tergum of the male are divided into two small apical lobes (on dorsal surface) by a median concavity (fig. 10a).

Type locality, Roggen, Colorado.

Type in collection at Colorado State Agriculture College.

The writer has specimens from Masonville, Colorado, July 12, 1937 (C. L. Johnson).

Omphrale valga n. sp.
(fig. 12a)

This species is related to **O. nubilipes** (Say) and to **beameri** n. sp. It is distinguished by having the abdominal terga three to five broad, revealing just a narrow white band of conjunctiva; the terga are three to four times wider than the white bands. The plates of ninth tergum differ by having a distinct lateral swelling and a short posterior lobe on dorsal portions.

In most respects this fits the description of **O. mirabilis** (Adams), the frontal groove is distinct and shining and the median portion of the front has a slightly depressed area at about one-third the distance from antennae to ocelli. The narrowed portion of the front is not much longer than the ocellar triangle. Almost entirely black species, usually only tarsi and spots at back of humeri and posterior calli yellow. Halteres brownish to black. The wings are faintly brownish tinged and the veins are brown. Venation as in **mirabilis** except that vein R_5 is scarcely longer than R_4. Abdomen, as stated above, is characterized by having all terga broad with but little conjunctiva showing. **Male genitalia:** The plates of ninth tergum fold around the genital structures, dorsal margins lobate on posterior portion (fig. 12a), clasping structures simple, curved inward. Aedeagus three pronged, the middle portion is curved dorsally. Cerci about two times as long as wide.

Length: body, 2.6 mm.; wings, 2.1 mm.

Holotype, male, Yosemite National Park, California, August 1, 1940 (R. H. Beamer); one paratype, male, same data as holotype and one paratype, male, from Big Bear Lake, Calif., July 26, 1932 (R. H. Beamer).

Types in Snow Entomological Collections.

THE LESSER CORNSTALK BORER, A PEST OF FALL BEANS[1]

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The lesser cornstalk borer[3] caused an unusual and a serious loss of stand in the fall bean crop in northwestern Arkansas during August, 1943. The loss of stand occurred during the seedling stage and frequently exceeded 50 per cent, and fields in which less than 20 per cent of the stand was destroyed were exceptional. Larvae of this borer were also present in all fiields of early beans, corn, and sorghum, wherever observations were made. In this paper the character and extent of injury, the factors associated with it in the field, and possible prevention are discussed. The most satisfactory description of the stages, life history, and seasonal history of the lesser cornstalk borer are given by Luginbill and Ainslee. (3).

The lesser cornstalk borer has been recognized in Arkansas during the past 20 years as an occasional local pest of its various hosts, particularly of corn, beans, and cowpeas. The injury which was observed, however, has never appeared to be extensive. Usually it involved injury to stand in spots covering a few square rods. In an extreme instance the stand of nearly an acre of corn planted in June was practically destroyed. Similarly, only injury of local importance has been recorded by previous observers, including Riley (4), Chittenden (2), and Luginbill and Ainslee (3). By the latter the destruction of stand covering as much as two acres was given special notice.

In contrast to previous records, the current outbreak was both general and severe. Throughout the commercial bean growing area, consisting of 11 counties in the northwestern part of the state extending from the Arkansas River Valley on the south to the Missouri line on the north, the borer was consistently injurious. The stand of all fields of fall beans observed was reduced, except for a few restricted spots which will be discussed later. Infestations were also found in other parts of the state. In addition to the fall bean injury, the borer was invariably found in fields of early beans and of corn, although injury was not obvious.

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1 Research paper no. 783. Journal series, University of Arkansas.

2 The writers are indebted to E. L. Gilliland, instructor in vocational agriculture at Rogers, Arkansas, for a part of the field records.

3 **Elasmopalpus lignosellus** (Zeller); order Lepidoptera, family Phycitidae. Determined by Carl Heinrich, U.S. Bureau of Entomology and Plant Quarantine.

The average reduction of stand in fields of fall beans was not less than 30 per cent. As an illustration of extreme injury, in one field of 18 acres which was visited about 10 days after the bean plants had emerged from the soil, 80 per cent of the plants had been killed. As already stated, fields in which the injury was less than 20 per cent were rare. If a loss of 30 per cent of the stand is taken as average, the loss in a single county, in which the damage was typical and for which estimates of the acreage planted in fall beans is available, would be not less than 1,200 acres. The total reduction of stand of fall beans in the state must have amounted to several thousand acres. This estimate takes no account of the less obvious damage to other crops where the stand was not injured but where some reduction in yield must have occurred.

HOSTS

The lesser cornstalk borer feeds upon a wide range of plants. Most of the hosts which have been recorded are grasses or legumes. Since it has also been found attacking plants as distantly related to these groups as turnips and strawberries, it is likely that its range of hosts is only partly known. The hosts recorded by Luginbill and Ainslee (3) include beans, cowpeas, peanuts, corn, crab grass, chufa, Japanese cane, sugar cane, sorghum, milo, Johnson grass, wheat, and turnips. Observations in Arkansas would add to the list foxtail, barnyard grass, and strawberries. No attempt has been made to determine the limits of the plant species attacked. Crab grass was the most important weed host, in part because of its general distribution and abundance.

The plants listed as hosts are not necessarily equally favorable to the lesser cornstalk borer. As for instance, in limited life-history studies it was found that the survival of newly hatched larvae placed on seedling corn was much higher than that of larvae placed on beans. Furthermore, the time required for completion of larval development on corn was about three-fourths as long as that on beans. When both host plants were available, corn was preferred.

CHARACTER OF INJURY

The young bean plants were particularly susceptible to injury during the first two weeks after emergence from the soil. The stems of these plants were attacked by the larva most often below the soil surface. The larva fed within the stem and when the inner tissue of the plant was nearly destroyed, emerged either above or below the surface of the soil. A plant so injured wilted within a day and the larva migrated to another plant. Migrating larvae were observed moving from plant to plant, even during the heat of the day. Thus a single larva was capable of destroying a number of seedling bean plants.

Bean plants 60 days old or more could support several larvae without being noticeably injured. Usually the larvae did not feed within the woody stem of an older plant but upon the green tissues around the underground stem, although at times they were found within the stem itself. In fields

of beans old enough to set fruit and of well grown corn, the number of larvae to a square yard was frequently much greater than in fields of late beans, but since the older plants were less susceptible to injury, they were not destroyed and the infestation was not obvious.

The injured rows or spots were conspicuously marked in fields of young beans by the rows of wilted plants. At the underground point of entry, a long silken tube covered with particles of soil was frequently found. This tube, which is characteristic of many of the sod webworms, might be used as an additional identification character. The larvae found in the beans were frequently so large that it was apparent that they were older than the bean plants themselves, indicating that they had begun their development on another host. Larvae of the lesser cornstalk borer were also collected on the underground stems of grasses within the bean fields. The most common of these grasses were crab grass, foxtail, barnyard grass, and Johnson grass. The most frequent injury to corn, as it appeared on full grown plants in August, was characterized by burrows within the roots which form the circle nearest the surface of the soil and sometimes within the brace roots. Larvae were also found feeding on the green part of the cortex of stalks behind the leaf sheaths at the lower nodes. The injury to peanuts was to both underground stems and developing nuts.

The destructiveness of the lesser cornstalk borer in 1943 could not have occurred in such unusual proportions had there not been great increase in acreage of a host which was in a stage of development susceptible to injury at the same time that borers were present in large numbers. The abundance of borers at this time had been favored by a heavy rainfall during May and June which, coupled with a shortage of labor, resulted in a widespread infestation of fields with crab grass. During this season, crab grass was the most important weed host. Some such injury may have occurred during previous years and have been overlooked. In 1943 before the larvae were found in the bean stalks, growers frequently attributed the loss of stand to drought or to fertilizer injury. Nevertheless, the outbreak in 1943 was unique in extent and severity since any approach to it could not have escaped attention.

The bean acreage in Arkansas has increased several fold during the past few years. The average commercial acreage for the 10-year period prior to 1943 has been estimated at 3,450 acres (Bryan et al). While a complete estimate for the acreage in 1943 is not available, the expected acreage was more than 10 times greater than the average for the 10-year period. For example, in a single county, Benton,[4] for which estimates are available, the beans which were planted in 1943 totaled 7,000 acres, of which 4,000 acres were fall beans. In 1938 the commercial crop in the same county was from 1,000 to 1,500 acres.

All of the infested fields had certain characteristics in common. Most of them had produced a spring crop of beans. In all of the infested fields there

4 Estimates by P. R. Corley, County Agent, Benton County.

had been a heavy growth of crab grass and some other wild grasses. Some of the fields had been plowed and disked only a few days before planting. Others had been prepared a few weeks before. However, in none of the infested fields which were observed had the preparation been thorough enough to destroy all grass, for clumps of grass were found in all fields with webs of the borers attached to the stems. It appeared that a partial destruction of the hosts had been just enough to have hastened a migration to the new crop. Roughly there appeared to be a direct relationship between the amount of crop and weed residue in a field and the severity of borer infestation.

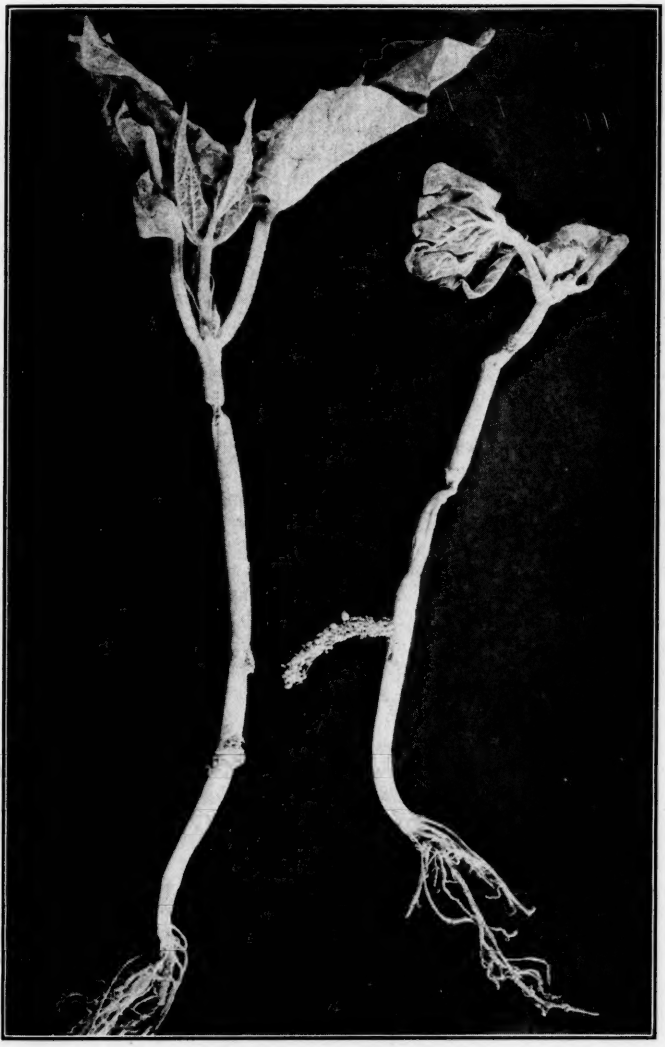
The source of infestation was also shown by a study of the uninfested crops. In the uplands only one uninfested field was found. It was within 600 yards of another field in which the stand had been practically destroyed. In the uninfested field there was no obvious crop residue two weeks after planting. The land had been in lespedeza in 1942, and had produced a spring crop of beans. The field was on well drained upland and the owner had been fortunate in being able to cultivate early enough to destroy any start of wild grasses that might have appeared in his first crop. The field had been thoroughly prepared about three weeks before planting. In another upland field in which the infestation was relatively light, that is only about 15 per cent of the stand destroyed, most of the heavy growth of crab grass which had infested the early crop was removed at the time the land was prepared for replanting.

A large acreage of beans was planted late in August in Crawford County in the Arkansas River bottoms on land that had been subjected to overflow during the flood in May which covered thousands of acres of farm land. The flood destroyed all the early crops and weeds, and had the effect of complete clean cultivation. After the water had receded and the land had dried, it had been given clean cultivation prior to planting to beans. These fields in the flooded area make up the restricted territory, previously referred to, in which no infestation was found. In contrast, stands of beans grown on land nearby, which had not been subjected to flooding but which had been infested with grass, were seriously injured.

The season was one which might have been expected to be favorable to the lesser cornstalk borer. During May rainfall occurred on 17 days at Fayetteville and exceeded a total of 15 inches. The excessive rainfall, together with a shortage of labor, interfered with clean cultivation of crops and resulted in a much heavier growth of crab grass than is usual. During July and August drought and heat were excessive. High temperature according to Luginbill and Ainslee is favorable to the insect. In any case it caused injured plants to wilt more quickly and make the injury more obvious.

PREVENTION OF INJURY

The observations indicate that complete destruction or removal of all living plant residue in fields some weeks before planting a late bean crop



Seedling bean plants showing injury with larval tube attached to stem at point of entrance. (Photo by Weldon Larimore, student assistant, Department of Entomology).

would prevent an outbreak such as the one described. In such fields partly grown larvae that had begun their development on other hosts would not be present at the time seedling bean plants emerged from the soil. Larvae hatching from eggs deposited in a field after plants were up could not have caused such severe injury since, during the period which is necessary for incubation and for the larvae to attain a destructive size, the most susceptible stage of the beans would have passed. This method of control has the weakness of depending upon complete destruction of all intermediate hosts before planting. The requirement of thoroughness was shown in infested fields which had been prepared for planting three or four weeks before harvest and in which, nevertheless, enough plants survived the cultural practices employed to maintain an infestation of borers. Shortage of labor, conflict with other farm operations, or unfavorable weather may frequently interfere with thoroughness unless the farmer is impressed with the importance of this operation. Since the pest appears to be erractic in occurrence, inspection of the underground stems of its hosts present in a field before planting may be a guide for procedure.

The recommendation of Luginbill and Ainslee for the destruction of all stages occurring in plant residue during winter no doubt will prevent or reduce the severity of early infestations, and thus indirectly protect late crops. Since, however, there are several generations a year, it is possible for the pest to occur in large numbers by midsummer even though the first generation has been very small. For this reason, additional control measures for late crops may be necessary.

Control with an insecticidal dust was given trial since the borers migrated from plant to plant. Cryolite, barium fluosilicate, and calcium arsenate were used by applying the dust to the stems and under sides of the foliage. No satisfactory results were secured. It is probable that many of the plants in all plots were infested at the time dust applications were made.

SUMMARY

The lesser cornstalk borer, ordinarily considered a minor or a local pest, destroyed several thousand acres of fall beans in the seedling stage in northwestern Arkansas in August, 1943. In addition, an infestation occurred on practically all of its other hosts in this area. Apparently most of the injury to seedling beans was caused by partly grown larvae which had developed in the fields either on previous crops or on weed grasses in these fields. Complete destruction of these hosts three or four weeks before planting is the most obvious means of preventing such injury. Observations in fields prior to planting beans, to determine the presence or absence of a destructive infestation, would be of value in determining the need of preventive measures.

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NEW MUSCOID DIPTERA FROM THE UNITED STATES[1]

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Most of the new forms described below were encountered in a study of some recent additions of Tachinidae to the Snow Entomological Collections at the University of Kansas. The specimens were collected, in large part, during the course of various expeditions to southeastern and western states under the direction of Dr. R. H. Beamer, to whom I am indebted for the privilege of studying the material. Some additional material in my collection, representing identical or related new forms, has been included. Types of the new species, unless otherwise indicated under the descriptions, are deposited in the Kansas University Museum.

Eumacronychia duplicata, n. sp.

Similar to **E. prolixa**, but smaller and not so elongate in build. There are also distinct differences in the genitalia.

Male.—Front at antennal base about equal eye width, widening slightly toward vertex; parafrontals pale pollinose, face and cheeks concolorous but more silvery; frontal vitta pale orange yellow, gradually widened toward vertex, at middle nearly twice parafrontal width; verticals two pairs, outer about half as long as inner; ocellars proclinate and strongly divaricate; frontals rather weak, set close to lateral margin of frontal vitta and stopping at antennal base; two proclinate and one reclinate orbital bristles; antennae nearly as long as face, wholly orange yellow, third segment not quite three times longer than second; arista slightly darker than antennae, bare, thickened about to middle, proximal segments short; face rather deeply excavated, its ridges bare, hardly diverging downward; vibrissae near oral margin, not approximated; parafacial wider than clypeus, sparsely clothed with very minute or inconspicuous pale hairs; palpi yellow, subequal length of haustellum and slightly thickened near tips; proboscis short; cheek with black hairs on lower border, nearly one-third eye height; eyes bare, slightly oblique and nearly reaching vibrissal level; back of head sparsely clothed with short black hairs.

Thorax including scutellum black, with heavy pale grayish pollen, notum vaguely vittate; acrostichal bristles absent or hairlike, dorsocentrals 2 before suture and 3 behind; pteropleural vestigial; sternopleurals 2; scu-

1 Contribution No. 837, Division of Entomology, Texas Agricultural Experiment Station.

tellum with 2 good-sized lateral and a small decussate apical pair, no discals; prosternum and propleura bare; calypters opaque white; infrascutellum not developed.

Abdomen elongate tapering apically, black except anal segment which is wholly orange yellow, silvery pollen bands sharply defined on basal three-fifths of segments two and three but on less than basal half on anal; second segment with one pair of median marginals, third and fourth each with marginal row; genital segments orange yellow, rather large and prominent; inner forceps elongate, triangular as viewed from behind, united nearly to middle thence divided into two slender blackish prongs tapering to acute tips; outer forceps hardly heavier or shorter than inner pair, curved outward near base thence strongly inward to tip, latter blunt with a minute tooth on anterior extremity; penis short, basal segment supported by a chitinized rod from near apex of which arises a backwardly directed short tubular segment membranous in structure; fifth sternite with a broad and deep U-shaped median incision, lobes not prominent, inner apical margin evenly rounded, clothed with fine black hairs.

Legs black; hind tibia with two or three unequal bristles on outer posterior side and mid tibia with one smallish bristle on outer front side near middle; claws and pulvilli elongate.

Wings hyaline; first posterior cell narrowly open far before wing tip; third vein setulose halfway or more to small cross vein; last section of fifth vein about two-fifths length of preceding; costal spine slender, shorter than small cross vein.

Female.—Front at antennal base about equal eye width; arista dark brown, palpi distinctly thickened apically; third antennal segment about two and one-half times length of second; abdomen shorter and broader than in male, pollen bands occupynig basal two-thirds of last three segments; first genital segment slightly arched at middle above; claws and pulvilli short.

Length, 5.5-7 mm.

Holotype male and allotype female, Albuquerque, New Mexico, July 1 and 5, 1941 (R.H. Beamer). Paratypes; 3 males, same data as type.

Sciasma lustrans, n. sp.

Body wholly shining black, legs orange red tibiae blackish; wings infuscated costally to apex of discal cell thence whitish to tip; third vein evanescent near wing tip.

Male.—Front very much narrowed at middle thence diverging upwards to width of ocellar triangle; frontal vitta black, reduced to a line above middle; parafrontal very narrow, shiny black but with a whitish bloom apparent on lower part; frontals short, stopping at triangle, one or two bristles beneath antennal base; inner verticals straight; ocellars reduced to small stubby proclinate hairs; face rather deeply impressed, its ridges oblique, bearing a few hairs next to vibrissae, which are on oral margin; epistoma short, hardly narrowed from clypeus and only slightly bowed forward from

same; parafacial sublinear, bare, blackish; antennae wholly yellow, third segment hardly one and one-half times longer than second and reaching nearly to oral margin; arista bare, very slender or bristlelike, middle segment thickened but short; eye bare, large, occupying most of head in profile and reaching below vibrissal level; cheek very narrow, subshiny black; proboscis short, palpi yellow, tips moderately thickened; back of head shining black, much flattened above middle, sparsely black-haired.

Thorax and scutellum black, destitute of pollen and weakly bristled; two postsutural dorsocentrals and sternopleurals; pteropleural minute; scutellum with two good-sized laterals, hindmost near apex and decussate; infrascutellum normally developed; calypters transparent brown, hind lobe longer than wide; prosternum bare; propleura bristled on front margin.

Abdomen long ovate, first segment longer than any following, last two each with a marginal row of microchaetae; hypopygium large, curved forward beneath tip of abdomen, sternites covered.

Legs rather weakly bristled, femora considerable thickened; hind tibiae not ciliated; claws and pulvilli hardly half as long as apical tarsal segment.

Wings long and narrow, brownish on costal margin to apex of second vein thence whitish hyaline to tip; first posterior cell narrow, closed, petiole nearly twice length of apical cross vein and reaching costa at exact wing tip; hind cross vein straight, distinctly nearer small cross vein than bend; latter rounded rectangular, without stump or fold; costal spine vestigial.

Length, 3.5-4 mm.

Holotype: male, Mt. Diabolo, Calif., July 16, 1933 (R. H. Beamer). Paratype: 1 male, Cajon Pass, Calif., August 6, 1936 (R. H. Beamer).

Plagiomima haustellata, n. sp.

Allied to **P. anomala**, but at once distinguished by the longer proboscis and subfasciate abdomen.

Male.—Front at vertex 0.48 of head width, diverging slightly downward; pollen of head grayish on parafrontals, subsilvery on parafacials and cheeks; latter bare, reddish in ground color, nearly one-half eye height; parafacials setose except on outer margin, nearly equal clypeal width; facial ridges bare; lowermost frontals upturned, well below base of antennae; ocellars large, curved outward and but slightly forward; two pairs of strong verticals and proclinate orbitals; antennae reaching nearly to epistoma, proximal segments reddish yellow, third black and about twice length of second; arista shorter than third antennal segment, thickened on over basal half, tapering to sharp tip; proboscis extra long, extending almost to mid venter, (the haustellum is laterally compressed in all available specimens, so that it appears unusually thick in profile), labella small; palpi yellow, slender, about two-thirds length of third antennal segment; back of head moderately bulged, clothed with short pale hairs.

Thorax and scutellum black, gray pollinose; notum marked with four rather shiny black vittae; acrostichal 3, 3; dorsocentral 3, 3; humeral 3-4; posthumeral 2; presutural 2; intraalar 3; supraalar 3 (middle one very

large); postalar 2 (hindmost very large); sternopleural 2, 1; pteropleural 1 (small); scutellum with 2 lateral (hindmost very large) and 1 strong decussate apical besides a small preapical and discal pair; prosternum, propleura and sides of postnotum beneath calypters bare.

Abdomen long ovate, black in ground color, with gray pollen in evident cross bands on basal two-thirds of segments two to four, remainder of each shining black; second segment with one pair of median marginals, last two each with marginal row; genital segments moderately large, black; inner forceps reddish, united and slender to tip; outer forceps subtriangular in profile with anterior edge straight, tips rather blunt; penis ribbonlike; fifth sternite black, deeply divided.

Legs moderately long, black with tibiae slightly reddish; middle pair of latter with row of five or six unequal-sized bristles on outer front side; claws and pulvilli slightly elongated but shorter than apical tarsal segment.

Wings hyaline; first, third and fifth veins setose in part; last section of fifth vein equal length of preceding section; hind cross vein oblique, nearly midway between small cross vein and bend of fourth; latter with long stump; first posterior cell open far before wing tip; costal spine vestigial.

Female.—Very similar to male, except for sexual differences.

Length, 9-11 mm.

Holotype male and allotype female, labeled "Anderson Co., Ks., 1047, 15 (R. H. Beamer)" Paratypes: 1 male and 2 females same data as type; 4 males, Allen Co., Ks., 1962, 15 (R. H. Beamer; 5 females, "Clark Co., Kan. 1950 ft., August 15-25, 1911 (F. X. Williams)"; 1 female, Elsinore, Utah, August 12, 1936 (M. B. Jackson).

Orthosia, n. gen.

Differs from **Microchaetina** in having the face much more deeply impressed and receding; epistoma short, not narrowed from clypeus; vibrissae on oral margin; hind crossvein less retracted, etc.

Male only.—Head a trifle wider than high, frontal profile slightly sloped, four-fifths length of receding concave facial; antennal axis well above eye middle and about two-fifths longer than vibrissal, latter considerably above lower edge of head; clypeus deeply sunk; epistoma wide, bowed sharply forward from clypeal plane; facial ridges bare, not strongly divergent downward; front at vertex over one-third of head width, gradually widened downward to antennae; frontal rows not or but weakly divergent anteriorly, one or two bristles below antennal base; inner verticals long, suberect; two proclinate orbitals; ocellars strong, proclinate and divergent; parafacial rather narrow, beset with short hairs and a median row of longer infraclinate bristles extending from aristal level to cheek groove; antennae as long as face, first segment short, third nearly five times longer than second; arista long pubescent or short-haired, thickened to middle, proximal segments short; eye bare, smallish, not reaching vibrissal level; cheek nearly three-fourths eye height; proboscis short, haustellum moderately slender; palpi small, subfiliform; back of head convex and somewhat bulged below middle.

Thoracic chaetotaxy: acrostichal 2, 3 (first two pairs behind suture small); dorsocentral 3, 3; intraalar 2; supraalar 3; presutural 1 (outer); posthumeral 1; humeral 3-4; notopleural 2; postalar 2; intrapostalar small; sternopleural 2, 1; pteropleural (small); scutellum with 2 lateral, 1 decussate apical (nearly as strong as hind lateral) and 1 small discal pair; prosternum, propleura and sides of postnotum beneath calypters bare; infrascutellum normal in size; hind lobe of calypter moderately large, roundish. Abdomen at base nearly as wide as thorax and rather strongly tapered toward apex; basal segment without median marginal bristles, second and third each with one stoutish pair set far forward from hind margin and a smaller discal pair on third segment (lacking in one specimen); anal segment with a discal and marginal row; sternites covered. Legs moderately long and slender; hind tibiae not ciliated; claws and pulvilli shorter than apical tarsal segment. Wings normal in size and shape; first vein bare; hind cross vein subperpendicular to fourth and joining latter about midway between bend and small cross vein; first posterior cell closed, petiole three-fourths length of apical cross vein and reaching costa far before wing tip; bend of fourth vein nearly rectangular bearing a short stump or fold; last section of fifth vein barely over one-half length of preceding; costal spine subequal length of small cross vein.

Genotype: **Orthosia montana**, n. sp.

Orthosia montana, n. sp.

Male.—Front at vertex 0.38 of head width (average of two specimens), widening to 0.50 of same at base of antennae; frontal vitta deep red, broader than usual and occupying most of frontal width at vertex; parafrontals and parafacials gray pollinose on blackish ground color; cheek grooves broadly red, this color extending upward to include vibrissal angles and lower inner margin of parafacials; basal segments of antennae red, third wholly black, rather slender but wider than parafacial; arista black, subequal length of third antennal segment; palpi yellow; back of head gray pollinose, sparsely clothed with black hairs intermixed with pale ones below.

Thorax black, gray pollinose, notum with four poorly defined dark vittae, outer ones interrupted at suture and inner pair obsolete shortly behind; scutellum black, tinged with red at apex, disk dusted with gray pollen; calypters tawny.

Abdomen black with changeable gray pollen above extending to hind margin on all segments, viewed at a flat rear angle the pollen shows a distinct brownish tinge; hypopygium blackish, retracted; forceps small; fifth sternite with a deep apical V-shaped incision, black lobes subshiny and sparsely haired.

Legs black, tibiae, trochanters and sometimes femora on lower edge before apex tinged with red or yellow; middle tibiae with one anterodorsal bristle; pulvilli nearly one-half length of last tarsal segment.

Wings gray hyaline, slightly infuscated along cross veins; stigmal section

of costa short; small cross vein opposite apex of first; epaulet and subepaulet red.

Length, 5 mm.

Holotype: male, Santa Cruz Mts., Calif., August 13, 1938 (R. I. Sailor). Paratype 1 male, same data as type, collected by L. W. Hepner.

Orthosia palaga, n. sp.

Female.—Similar to the preceding species except as follows: Front at vertex 0.41 of head width, gradually widening downward to antennal base; facial depression including inner margin of parafacial to antennal base red in ground color; antennae barely two-thirds length of face, proximal segments and base of third pale reddish, latter slender, three to four times second; arista thickened on basal third; parafacial over one-half clypeal width, sparsely short-haired with a median row of bristly hairs becoming stronger downward; face not strongly receding; clypeus moderately depressed; epistoma gently bowed forward; eye rather strongly oblique. Abdomen ovate, third segment with one pair of good-sized discals; genitalia not adapted for piercing. Legs red, tarsi blackish; claws and pulvilli short.

Length, 5 mm.

Holotype: female, Santa Cruz Mts., Calif., August 13, 1938 (L. W. Hepner). Paratype; 1 female, same data as type, taken by Dr. R. H. Beamer.

Orestilla, n. gen.

Differs from **Microchaetina** in having wider and wholly bare parafacials; antennal axis well below eye middle; last section of fifth vein less than half as long as preceding; other differences are listed below.

Head as wide as high, frontal profile well sloped and distinctly longer than facial, latter hardly receding; antennal axis subequal length of oral; clypeus a little depressed, much narrower than parafacial; epistoma slightly elongated, gently bowed forward and considerably narrowed from clypeus; vibrissae well above oral margin; facial ridges bare, subparallel; frontal rows stopping near base of antennae; two proclinate orbitals in female and usually only one in male; latter without outer verticals; ocellars strong, proclinate; antennae reaching well below middle of face, first segment short, third a little longer than second; arista distinctly longer than antennae, short plumose to tip, proximal segments short but distinct; proboscis rather slender, hardly two-thirds head height; palpi moderately long, with tips slightly thickened in female; eye bare, oblique, not reaching vibrissal level; cheek about two-thirds eye height. Thoracic chaetotaxy similar to preceding species, but with 3 intraalars and presutural acrostichals; intrapostalar differentiated; hind lobe of calypter wider than long; prosternum and propleura bare. Abdomen rather narrow in both sexes and slightly elongate; first segment without median marginal bristles, second with one pair, third and fourth each with a marginal row, no discals; sternites covered. Legs rather long, fore tarsi moderately slender and exceeding length of tibiae; male claws and pulvilli strongly elongated. Wings not very broad,

reaching a little beyond apex of abdomen; first vein bare, third with one to four hairs near base; hind cross vein slightly nearer bend than small cross vein; first posterior cell closed with petiole usually less than twice length of small cross vein, reaching costa far before wing tip; costal spine strong.

Genotype: **Orestilla primoris**, n. sp.

Orestilla primoris, n. sp.

Male.—Front at vertex 0.31 of head width, equibroad to middle thence widening to 0.48 of same at antennal base; head pale or yellowish in ground color, occiput darker or blackish on upper half; parafrontals, parafacials and cheeks whitish to silvery pollinose; frontal stripe reddish yellow, at middle subequal or slightly exceeding parafrontal width; antennae wholly reddish yellow, third segment somewhat narrowed toward rounded apex; arista thickened and brownish near base thence paler to tip; parafacial wider than clypeus, not narrowed downward; cheek sparsely black-haired; palpi yellow; back of head slightly bulged at sides below, pale pollinose, thinly clothed with short white hairs and some coarser black ones behind occipital fringe above.

Thorax black, humeri and scutellum beyond basal margin reddish in ground color, dusted with opaque gray pollen, notum not distinctly vittate; calypters white.

Abdomen reddish yellow with a black dorsal vitta sometimes poorly defined and widening behind to include basal margin of segments three and four, rather evenly dusted with thin white pollen which extends on venter; genitalia reddish; inner forceps very slender, united and tapering to a sharp tip; outer pair much heavier; fifth sternite with a deep V-shaped apical incision, lobes exposed, beset with fine short blackish hairs.

Legs pale reddish, femora darker or blackish on basal half; mid tibia with one good-sized bristle on outer front side near middle; hind tibia not ciliated; claws and pulvilli longer than apical tarsal segment.

Wings subhyaline with a faint uniform tawny tinge; bend of fourth vein obtuse, usually without a stump but sometimes a short one present; epaulets red, subepaulets pale yellow.

Female.—Front at vertex 0.42 of head width (average of three), widening but little to antennal base; outer verticals weak and barely differentiated; third antennal segment nearly twice length of second; abdomen broader at middle and more pointed apically; genitalia retracted, not adapted for piercing; claws and pulvilli short; otherwise similar to male.

Length, 6-7 mm.

Holotype male and allotype female, Cuervo, N. M., June 23, 1940 (D. E. Hardy). Paratypes: 1 male and 2 females, same data as type (R. H. Beamer; L. J. Lipovsky); 2 males and 2 females, Estancia, N. M., June 24, 1940 (R. H. Beamer, L. J. Lipovsky, E. E. Kenaga and L. C. Kuitert); 1 male, Grady, N. M., July 16, 1936 (M. B. Jackson), and one pair in my collection, Red River, N. M., August 14, 1940, 9000 ft., (F. Snyder).

Nicephorus, n. gen.

Related to **Opsotheresia**, but much less robust in build; antennal axis higher up and close to eye middle; haustellum barely exceeding one-half head height; eye reaching to vibrissal level, etc.

Head a trifle wider than high, with long horizontal oral profile at right angle to occipital, flat frontal profile strongly sloped and one-third longer than facial; antennal axis shorter than oral, latter about three-fourths head height; face moderately impressed on sides with a high wide median carina, flattened crest of latter gently arcuate in profile; facial ridges flat, bearing a few bristly hairs next to vibrissae; latter considerably above oral margin; parafacial bare, equibroad downward but narrower than clypeus; epistoma subnasutely produced and slightly prolonged downward; bases of antennae well separated, first segment flush, third slender, nearly three times second and reaching lower third of face; arista barely longer than third antennal segment, long plumose to tip, basal segments short; frontal bristles in a single row extending to base of antennae; ocellars proclinate, divaricate; outer verticals and two proclinate orbitals in female; eye bare, nearly vertical; cheek one-fourth to one-third eye height; proboscis rather slender but not very long, labella small; palpi slender, slightly thickened at tip. Thoracic chaetotaxy: acrostichal 3, 3; dorsocentral 3, 4; intraalar 2 (none near suture); supraalar 4 (only two large); humeral 3-5; posthumeral 2; presutural 1 (outer); notopleural 2; postalar 2; intrapostalar barely differentiated; pteropleural 1 (moderately long and 2 or 3 weaker bristles in front and behind); sternopleural 2, 1; scutellum with 2 lateral and 1 slightly smaller decussate apical pair besides an arcuate row of discals behind middle; propleura haired; prosternum and sides of postnotum beneath calypters bare; infrascutellum well developed. Abdomen subovate, slightly wider than thorax; last two segments each with a row of marginal bristles; sternites covered; genitalia small and retracted. Legs moderately long and slender; hind tibiae short ciliate; male claws and pulvilli short. Wings ordinary in shape; first vein bare, third with three to five minute hairs near base; first posterior cell narrowly open well before wing tip; bend of fourth vein obtuse, stumpless, close to hind margin of wing; hind cross vein oblique, joining fourth nearer bend than small cross vein; costal spine vestigial.

Genotype: **Nicephorus floridensis**, n. sp.

Nicephorus floridensis, n. sp.

Male.—Front at vertex 0.22 of head width, nearly equibroad to middle thence widening moderately to antennal base; sides of front and face with satiny yellow pollen on reddish ground color becoming blackish below cheek groove; frontal vitta deep red, moderately narrowed upwards but much wider than parafrontal; basal segments of antennae reddish, third infuscated beyond arista; latter black, thickened at base; palpi yellow, sparsely short-haired; cheek one-third eye height; back of head flat, gray pollinose, moderately clothed with short pale hairs.

Thorax and scutellum black, gray pollinose, notum with three subshiny black vittae extending nearly to scutellum, the median one before suture divided by parallel pollen bands leaving a very narrow but distinct dark stripe on either side of a wider middle one; calypters white.

Abdomen black, sides and anal segment largely reddish, dusted with changeable gray pollen above which extends to hind margin on all segments but more thinly so on the last; genitalia red, outer forceps broad or plate-like; inner pair small, united, tapering to a fine tip; fifth sternite red, lobes darker, exposed and widely separated apically.

Legs black with trochanters rather sharply contrasting reddish yellow; mid tibia with two small bristles near middle on outer front side; tarsi slender.

Wings hyaline with a slight yellowish tinge becoming gray towards hind margin; veins including costa yellow; epaulet black, subepaulet pale yellow.

Female.—Front at vertex 0.32 of head width widening gradually to antennae; parafrontal and parafacial gray to silvery, latter nearly equal clypeal width; cheek about one-third eye height; abdomen black on sides, second segment with pair of median marginals.

Length, 7-9.5 mm.

Holotype male and allotype female, Hilliard, Florida, July 24, 1939 (R. H. Beamer). Paratypes: 17 males and 6 females all from Florida as follows: Hilliard, August, 1930 (Paul W. Oman), July and August, 1939 (R. H. Beamer); Branford, July, 1930 (R. H. Beamer and J. Nottingham), August, 1939 (D. E. Hardy); Suwannee, August, 1939 (R. H. Beamer).

Masiphyomyia, n. gen.

Allied to **Siphosturmiopsis** and **Siphosturmia**, but differing from both in having hairy eyes.

Head fully one-third wider than high, oral margin axis four-fifths antennal, which is near or just above eye middle, facial profile concave below and a trifle longer than sloped frontal; face slightly impressed, its lateral ridges flattened and bare, diverging downward; epistoma gently bowed forward and nearly equal clypeal width; vibrissae slightly above oral margin; parafacial bare, narrowed downward; second antennal segment somewhat elongate, third segment in male barely two and in female slightly over two times second; arista bare, moderately thickened on basal half, middle segment twice longer than thick; frontal rows strongly divergent with two or three bristles beneath antennal base; ocellars large, proclinate; outer verticals developed and two proclinate orbitals in female; haustellum less than one-half head height but not very stout; palpi strongly bowed upwards, stout in female; cheek about one-fifth eye height; eye moderately long pilose, reaching to vibrissal level; back of head flat with lower margin behind oral cavity somewhat bulged. Thoracic chaetotaxy: acrostichal 3, 3; dorsocentral 3, 4; intraalar 3; supraalar 3; notopleural 2; presutural 2; humeral 3-4; posthumeral 2; postalar 2; intrapostalar moderately strong;

sternopleural 2, 2; pteropleural 1 (short); scutellum with 3 lateral, 1 good-sized decussate apical and 1 smaller discal pair; prosternum bristled, propleura and sides of postnotum beneath calypters bare; infrascutellum normally developed. Abdomen short, subconical, anal segment with truncate tip in female; basal segments each with one pair of median marginal bristles (weak on first) ; third segment with a marginal row and fourth with somewhat smaller irregularly spaced bristles on apical half above; sternites largely covered; female genitalia not adapted for piercing. Legs moderately bristled; hind tibiae ciliate; claws and pulvilli slightly elongate in male. Wings extending well beyond tip of abdomen, ordinary in shape; first vein bare, third with one or two hairs near base; bend of fourth vein rectangular to obtuse, without stump or fold; first posterior cell narrowly open far before wing tip; hind cross vein joining fourth nearer bend than small cross vein; last section of fifth vein short; costal spine vestigial.

Genotype: **Masiphyomyia alearis**, n. sp.

Masiphyomyia alearis, n. sp.

Male.—Front at vertex 0.36 and at base of antennae 0.42 of head width (one specimen); parafrontal pale golden, very sparsely clothed with fine hairs, at middle nearly twice wider than frontal stripe; upper two frontals stout and reclinate, preceding ones weaker, decussate to antennae, two below base of latter and not reaching level of arista; parafacial and cheek cinereous; antennae black, third segment moderately wide to rounded tip; palpi yellow, slender to tips; back of head gray pollinose, clothed with pale hairs.

Thorax black dusted with gray pollen tinged with yellow on notum; latter marked with four narrow vittae before suture and five behind, outer pair broadly interrupted at suture and the inner ones stopping shortly behind same; scutellum reddish yellow, beset with short erect bristly hairs; calypters opaque, white.

Abdomen broadly reddish on sides and venter almost entirely so; last three segments with extensive grayish pollen which is narrowly interrupted on median line; hairs on intermediate segments rather fine and erect but not very long; genital segments small, retracted; inner forceps black, short, divided beyond middle but not divergent, moderately thick and straight in profile; outer forceps yellowish, shorter but nearly as thick as inner ones; fifth sternite with U-shaped apical incision, lobes faintly pollinose, bearing only a few minute black hairs on inner margin.

Legs black; mid tibia with one stout bristle on outer front side near middle; claws and pulvilli about equal length of apical tarsal segment.

Wings gray hyaline; small cross vein far before apex of first; epaulets and subepaulets black.

Female.—Front at vertex 0.36 of head width (one specimen) widening gradually toward antennal base; second antennal segment reddish; palpi

strongly swollen beyond middle; abdominal segments two and three above with hairs wholly depressed; claws and pulvilli short.

Length, 8 mm.

Holotype male and allotype female, in my collection, College Station, Texas, May 15, 1943 and May 7, 1938 (H. J. Reinhard).

Masiphyomyia paralis, n. sp.

Male.—Front at vertex 0.36 of head width, hardly widening to middle thence rapidly so to about one-half head width at antennal base; parafrontal cinereous, moderately clothed with fine erect hairs, which extend beneath lowermost frontals, several good-sized bristles on anterior part of parafrontal outside main frontal rows; latter descending to level of arista, with three to five bristles below antennal base; second antennal segment one-half to three-fifths length of third; thorax thinly gray pollinose, notum subshining and indistinctly vittate.

Length, 7-8.5 mm.

Holotype male, in my collection, Otero Co., New Mexico, July 17, 1926. Paratypes: 1 male, same data as type, and 2 males, San Jacinto Mts. California, July 21, 1929 (Paul W. Oman) and (L. D. Anderson) in the Kansas University Collection.

Masiphyomyia comosa, n. sp.

Male.—Similar to **alearis**, differing mainly as follows: Front slightly wider, at vertex 0.38 of head width; parafrontals cinereous, rather thickly clothed with long hairs which extend downward nearly to middle of parafacials; frontal rows double anteriorly, four or five bristles beneath base of antennae extending to aristal level, uppermost three bristles stout and reclinate; second antennal segment over one-half length of third; parafacial two thirds clypeal width; cheek nearly one-third eye height; thorax lightly dusted with gray pollen, notum subshining and indistinctly vittate; abdomen with longish erect hairs on most of upper surface; second segment with two pairs of median marginals but outer one usually weak.

Length, 7-8.5 mm.

Holotype; male, in my collection, Boulder, Colorado, 6600 ft., June 30, 1932 (M. T. James). Paratypes: 1 male, San Berrardino Co., California, June 1, 1930 (D. G. Hall), and 1 male, labeled "Waterton Park, Alta., **Incisalia**, Rec: B C 2502, F. I. Survey 1941, Em. (Incubator) Feb. 13, 1942," in the Canadian National Collection.

The last mentioned specimen may not prove conspecific. It is blacker in general aspect; the antennae are somewhat longer, with third segment nearly twice longer than second; the hairs below lower frontals are sparser, shorter and do not reach to middle of parafacial.

Masiphyomyia longicornis, n. sp.

Similar to **alearis** in most respects, but at once distinguished from all related species described above by the longer antennae; third segment of latter reaching nearly to oral margin and four to six times length of second;

arista thickened nearly to apical fourth, middle segment slightly elongate; male vertex 0.37 and female 0.39 of head width; female palpi bowed as usual and moderately thickened apically; hairs on intermediate abdominal segments coarse or bristly and erect in both sexes; male pulvilli shorter than last tarsal segment.

Length, 7.5 mm.

Holotype female, allotype male, and paratype female in my collection, Brewster Co., Texas, August 8, 1937 (R. H. Baker).

Key to Species of **Masiphyomyia**

1. Third antennal segment at most barely exceeding twice length of second ..... 2.
   Third antennal segment at least three times length of second, (Texas) ..... **longicornis**, n. sp.
2. Two reclinate prevertical bristles; parafacial below lowermost frontals bare to sparsely haired ..... 3.
   Three reclinate prevertical bristles; parafacial moderately to thickly haired from lower frontals downward to level of mid face, male only, (Colorado, California, Alberta) **comosa**, n. sp.
3. Parafrontals pale to golden yellow; thorax and scutellum with heavy yellowish gray pollen above; hairs on intermediate abdominal segments erect in male, depressed in female, (Texas) ..... **alearis**, n. sp.
   Parafrontals cinereous; thorax and scutellum thinly gray pollinose above and subshining; hairs on intermediate abdominal segments bristly and erect in both sexes, (New Mexico, California) ..... **paralis**, n. sp.

Zenillia collina, n. sp.

Close to **Z. hyphantriae**, from which it differs in having second antennal segment wholly black and discals on intermediate abdominal segments. Also related to **Z. blanda**, but the front is distinctly wider, less prominent in profile, abdomen more heavily and uniformly pollinose, etc.

Male.—Front at vertex 0.27 of head width, hardly widening downward to middle thence more rapidly so to equal eye width at antennal base; sides of front and face with heavy gray pollen, almost silvery on latter; frontal vitta deep velvety brown, gradually narrowed upwards and cleft at ocellar triangle, latter with a pair of strong proclinate bristles and numerous fine hairs; parafrontal wider than vitta, clothed with sparse fine hairs on entire length; inner verticals strong, reclinate; frontals in single row, two or three bristles diverging beneath antennal base and two stout reclinate prevertical bristles; no proclinate orbitals; face moderately receding, deeply impressed, its ridges with a few bristles and fine hairs on lower fifth or sixth; epistoma short, in clypeal plane; vibrissae stout, decussate, on oral margin; parafacial bare, narrowed to less than width of third antennal segment on lower extremity; antennae reaching nearly to oral margin, basal segments short, third rather slender, straight on front edge and rounded on apex, five or six times longer than second; arista black, micro pubescent, thickened on basal fourth to third, proximal segments short; eyes large, moderately long

pilose; cheek hardly one-sixth eye height, gray pollinose, with a few hairs on lower edge; proboscis short, labella large, pale yellow; palpi yellow, moderately thickened apically, beset with numerous short black hairs except on extreme base; back of head flat, clothed with only pale hairs which are longer and thicker below middle.

Thorax and scutellum black, densely gray pollinose, marked with four dark dorsal vittae, outer pair broken at suture and inner stopping shortly behind latter. Chaetotaxy: acrostichal 3, 3; dorsocentral 3, 4; intraalar 3; supraalar 3; postalar 3; sternopleural 2, 1 (lower one small); pteropleural 1 (moderately long); intrapostalar distinct; notopleural 2; humeral 3; posthumeral 2; presutural 2; scutellum with 3 lateral (hindmost strong and divaricate), 1 discal and 1 weak decussate upturned apical pair; prosternum haired to bristled on sides; propleura bare; caypters white; infrascutellum normally developed.

Abdomen black, last three segments wholly gray pollinose; median marginals smallish on first segment but distinct, stouter pair on second; discals on intermediate segments sometimes irregularly spaced; third and fourth segments each with a marginal row besides a discal row on last; genitalia rather large but retracted; inner forceps heavy, weakly keeled behind to apical third thence sloped obliquely forward and divided to blunt apex; outer forceps fingerlike, longer than inner ones and slightly bowed forward before apex, outer side shiny brown, clothed with black hairs; penis black, terminating in a vase-like structure, deeply grooved in front and prolonged rearward at apex in a transparent membrane supported by a slender chitinized process on hind side; sternites covered.

Legs black; hind tibia short ciliate; middle tibia with one good-sized bristle on outer front side near middle; hind coxa with two bristly hairs on posterior apical margin; claws and pulvilli exceeding length of apical tarsal segment.

Wings hyaline; first vein bare, third with one or two hairs near base; first posterior cell narrowly open well before wing tip; bend of fourth vein broadly rounded, without stump or fold, beyond nearly straight and in plane of hind cross vein which joins fourth less than one-third distance from bend to small cross vein; costal spine vestigial; eqaulets blackish.

Female.—Front at vertex 0.35 of head width, gradually widening downward; outer verticals vestigial; two strong proclinate orbitals; antennae about three-fourths length of face, second segment slightly reddish; genitalia retracted, ventral; claws and pulvilli shorter than apical tarsal segment.

Length, 8.5-9 mm.

Holotype male, and allotype female, Chiricahua Mts., Arizona, July 4, 1940 (R. H. Beamer). Paratypes: 8 males, same data as type and 2 males collected by Dr. Beamer in same locality, August 7, 1941.

Sturmia crescentis, n. sp.

Close to **S. limata** Coquillett (**Zizyphomyia celer** Townsend) but at once distinguished by the narrower vertex in both sexes, abdomen blacker and

more shiny in female and anal segment with a basal pollen band above in male.

Male.—Front at vertex 0.34 of head width, equibroad to middle thence gradually widened to 0.45 of same at antennal base; sides of front and face including cheeks and posterior orbits gray to silvery pollinose; median vitta velvety reddish brown, at middle subequal parafrontal width; verticals two pairs; ocellars strong, proclinate; two stoutish reclinate prevertical bristles and two or three frontals beneath antennal base; parafacial bare, a little narrowed downward; face moderately impressed, espistoma short and broad, facial ridges with bristly hairs on lowest fourth; vibrissae on oral margin; antennae black tinged with red basally, third segment rather slender, two and one-half to three times second; arista blackish, moderately thickened on basal two-fifths, proximal segments short; proboscis short, palpi brown with tips usually paler or yellow; eyes bare; cheek about one-fifth eye height, clothed with black hairs.

Thorax and scutellum black, gray pollinose, notum with four blackish vittae before suture and five behind. Chaetotaxy: acrostichal 3, 3; dorsocentral 3, 4; intraalar 3; supraalar 3; presutural 2; posthumeral 2; humeral 4; notopleural 2; postaalar 2; intrapostalar strong; sternopleural 2, 2; pteropleural 1 (smaller than sternopleural); scutellum with 3 lateral, 1 decussate upturned apical and 1 good-sized reclinate discal pair; prosternum setose; propleura bare; calypters white.

Abdomen black, with silvery pollen on broad bases of intermediate segments at middle above and on narrow basal margin of fourth, remainder of segments polished or shiny; one pair of median marginal bristles on first two segments and marginal row on last two, besides a discal row on anal segment; venter shiny black, third and fourth segments with patches of appressed short soft hairs extending upwards on sides; hypopygium small, retracted; inner forceps slender and straight in profile, divided apically but not divergent, apex obliquely narrowed; outer forceps considerably thicker and shorter, beset with fine short hairs on outer side; fifth sternite deeply incised, lobes black with a few long hairs on inner margin.

Legs black, moderately bristled; mid tibia usually with one large and two smaller bristles near middle on outer front side; hind tibia subciliate; claws and pulvilli short.

Wings gray hyaline; third vein with two or three hairs near base; first posterior cell open far before wing tip; hind cross vein slightly nearer bend than small cross vein; costal spine minute.

Female.—Front at vertex 0.35 of head width gradually widening downward to antennae; two proclinate orbitals; second antennal segment reddish, about one-half length of third; fourth abdominal segment pollinose on basal third to half; anal orifice narrow, elongate; genitalia not adapted for piercing.

Length, 5.5-7 mm.

Holotype male and allotype female, College Station, Texas, May 1,

1929 (H. J. Reinhard). Paratypes: 42 males and 19 females, same locality as type, April to October, 1917-44 (H. J. Reinhard); 1 female, Dilley, Texas, June 1, 1934 (H. B. Parks); 1 male "Oklahoma, June 6, 1931," without collector's label; 1 male, Amherst, Ohio, July 6, 1935 (H. J. Reinhard), all in my collection; 1 male, Babylon, L. I., New York, June 24, 1933 (F. S. Blanton); 2 males, Franklin, North Carolina, August 17, 1939 (R. H. Beamer); 1 female, Cherokee Co., Ks., 888 ft. 1915 (R. H. Beamer) ; 1 female, Douglas Co., Ks., 900 ft. (F. H. Snow); and 1 female, Carlsbad, New Mexico, June 17, (E. M. and R. H. Painter), in the Kansas University Collection.

Peleteria mediana, n. sp.

A robust blackish species with the front considerably more prominent than in most related forms. The inner genital forceps in the male are deeply grooved behind as in **P. apicalis** Walker (**confusa** Curran) but without a prominent median lobe.

Male.—Front at vertex 0.42 of head width, slightly narrowed before ocellar triangle thence widening rapidly downward; parafrontal blackish, wider than median vitta; parafacial and cheek with satiny yellowish pollen; three to five pairs of proclinate orbital and two pairs of vertical bristles; frontal rows strongly divergent beneath antennal base and usually three bristles on lower part of parafacial near eye margin; basal antennal segments reddish tinged with black, third wholly black, strongly convex on front edge, shorter than second segment; palpi yellow, very slender and subequal length of haustellum; latter over three-fifths head height; back of head thickly clothed with long pale hairs.

Thorax black, lightly dusted with grayish pollen; notum subshiny but with four moderately broad black vittae defined before suture; scutellum reddish yellow except on narrow basal margin; acrostichal 3, 3; dorsocentral 4, 4; sternopleural normally 2, 1; pteropleural longer than sternopleural; scutellum with 4 lateral, 1 strong decussate apical, 1 preapical and several irregularly spaced discal pairs; calypters opaque white.

Abdomen black with sides of intermediate segments more or less reddish and basal margin of same sprinkled with changeable gray pollen, anal segment with similar pollen on basal half or more; median marginal bristles on first segment variable and sometimes only one bristle developed; second segment with one stout pair, third with marginal row and fourth with numerous irregularly spaced bristles on apical half above; genital segments smallish, retracted; inner forceps moderately broad, deeply grooved behind and obliquely truncate as viewed from rear, strongly bowed forward apically, bearing a small median lobe which is but slightly more prominent than lateral apical extremity; outer forceps slender, tapering to simple tip; fifth sternite shiny black, lobes normally divergent and evenly rounded apically; sternites exposed.

Legs black, tibiae reddish yellow; claws and pulvilli longer than apical tarsal segment.

Wings subhyaline, small cross vein infuscated; first posterior cell open far before wing tip; hind cross vein much nearer bend than small cross vein; costal spine minute; epaulet black.

Female.—Front at vertex 0.46 of head width; parafrontals reddish in ground color; abdomen wholly black and last three segments with heavier gray pollen than in male; first segment usually without median marginals; fore tarsi moderately widened, claws and pulvilli short.

Length, 11-13 mm.

Holotype male and allotype female, Waldport, Oregon, July 11, 1935 (Jack Beamer). Paratypes: 6 males and 3 females, same data as type; 1 female, Cliffdell, Washington, July 7, 1935 (E. I. Beamer); 3 males and 3 females, in my collection, Westport, Washington, May 28, and July 7, 1933 (Chas. H. Martin, J. Wilcox); 1 female, Corvallis, Oregon, May 10, 1930 (J. Wilcox); 1 female, Golden Gate Dunes, California, July 22, 1931 (Chas. H. Martin).

PRONECUPULATUS, A NEW GENUS OF TYDEIDAE (ACARINA) FROM MEXICO

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Pronecupulatus, n. g.

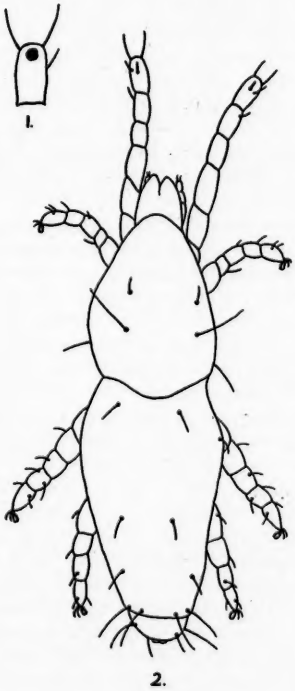
Pronematus-like in having no claws or tarsal pads on the first pair of legs, but differing in having what appears to be a hard, chitinous, cup-like organ on the lower distal surface of tarsus I. **Pronecupulatus anahuacensis**, n. sp., is designated as the type of the genus.

Pronecupulatus anahuacensis, n. sp. (Figs. 1, 2)

Small, elongated mite; white; skin finely striated; body furrow curving posteriorly on dorsum, entire (plain in fresh mount but almost impossible to see after a short time). Rostrum of normal size; venter with a pair of hairs out under segment I of palpus. Palpus short, reaching to tip of rostrum; segment II twice as long as III; III and IV appearing to be of the same length; segment IV with at least 2 simple, short (same length as segment) end hairs. Second mandibular segment probably short and curved. Cephalothorax 61 μ long and 64 μ wide; no eyes; sensory hairs plain, whiplike, about 33 μ long; thoracic shoulder hairs 22 μ long; others about 11 μ long. Abdominal hairs about 11 μ long, except those on posterior margin, which are 22 μ long with the center rear pair 11 μ long. Abdomen with 2 posterior, dorsal, transverse sutures. Female genital opening large (hairs, if any, not seen as flaps folded over). Anal opening far to the rear. Legs simple, short; leg IV reaching to rear edge of body; segments simple, sparsely haired.

Claws and strongly haired tarsal pads on legs II, III, and IV. Leg I without claws or pads, with 2 dorsal end hairs (about length of segment), a median, dorsal, clavate seta of medium length besides a simple hair, and ventrally and distally what appears to be a chitinous cup-like disc. Length with rostrum 216 μ, width 78 μ. Described from a single female.

This mite was found in lichens on trees along the drive to Chapultepec Castle, Mexico, D. F., March 15, 1943. It will be deposited in the United States National Museum, Washington, D. C., under Type Catalogue Number 2438.



EXPLANATION OF PLATE

1. Venter of tarsus I showing the chitinous cup-like organ.
2. Adult female.

A NEW SPECIES OF BRACON (HYMENOPTERA, BRACONIDAE) FROM KANSAS

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Bracon pascuensis n. sp.

Runs to couplet 13 in Muesebeck's key[1] but differs from **scanticorum** Viereck in having the ovipositor sheaths only half to two-thirds as long as the abdomen beyond second tergite, in the more or less roughened propodeum, and in lacking the lateral oblique foveolate furrows on the propodeum. From **pyralidiphagus** Muesebeck, to which it appears to be most closely related, it differs in having a median longitudinal roughened groove on the propodeum instead of a median longitudinal carina.

Female: Length 2½-3½ mm. Ovipositor ½ to ¾ mm. Head transverse, appearing from above to be about one-fourth broader than long; antennae 27-segmented in type, shorter than body; first flagellar segment approximately two and one-half times as long as thick and about one-fifth longer than second; all flagellar segments much longer than broad; malar space about one-fourth shorter than first segment of flagellum; face finely granular and opaque; frons minutely reticulately sculptured, sometimes only very weakly so, shining; eyes about twice as broad as temples and very slightly emarginate opposite antennal bases; clypeo-stomal line about twice the length of the tentorio-ocular line; face about two-thirds as long from lower margin of antennal sutures to ventral margin of clypeus as broad between eyes at the level of the lower margin of antennal sutures; ocell-ocular line about four times the diameter of a lateral ocellus; posterior and lateral ocellar lines subequal and twice the diameter of a lateral ocellus in length. Notaulices broadly impressed, sparsely pubescent anteriorly, more thickly so posteriorly; mesonotum and mesopleura smooth and polished; scutellum a little broader at base than long, with scattered hairs over its surface; propodeum varying from nearly smooth to roughened over most of its surface, usually roughened apically, with a stub of a median ridge at apex and a distinct median coarsely roughened groove from the anterior end of the stub to the base of the propodeum; metapleura polished on anterior two-thirds, roughened posteriorly. Stimga rather narrow, not angular; radius originating much beyond middle of stigma; radial cell short, attaining the wing margin at a point from about one-half to three-fourths the length of the stigma from the apex of the wing; first abscissa of radius about one-third the length of the first intercubitus and one-third to one-fourth the length of the second abscissa of radius. Posterior femora stout, about two and three-fourths times as long as broad. First abdominal tergite roughened laterally and apically, usually smooth centrally, rather sharply angled at

1 Muesebeck, C. F. W. "A Revision of the Parasitic Wasps of the Genus **Microbracon** Occurring in America North of Mexico."—Proc. U. S. Nat. Mus., 67, 1925, Art. 8, pp. 1-85.

the spiracles; second tergite subequal in length with the third, granular or granularly rugose and usually more strongly roughened basally in the middle, more or less emarginated posteriorly; suturiform articulation broad, shallow, very finely crenulated, usually bent forward distinctly in the middle and slightly so at the sides, but sometimes practically straight; third, fourth, fifth and sixth tergites granular, the sculpture becoming weaker posteriorly; sculpture of abdomen varying from minutely reticulate to strongly granular.

Reddish brown in color; head with face brown, vertex piceous, occiput and temples yellowish brown to piceous; antennae fuscous to piceous, darkest on distal two-thirds; mesonotal lobes from reddish brown to black; notaulices brown; scutellum, propodeum, and mesosternum brown to piceous; legs, including all coxae, reddish or yellowish brown to apical third of tibiae, fuscous beyond (in some cases reddish brown to apex of last tarsal segment which is dark brown); abdomen reddish or yellowish brown, the first tergite and median basal area of second sometimes contrastingly dark brown to piceous; ovipositor sheaths black; wings nearly hyaline, stigma yellowish to brown, nervures brown.

Male: Essentially as in female after allowance is made for the usual sexual dixerences. Antennae 29-segmented in allotype.

Host: Unknown.

Type-locality: Stafford Co., Kansas.

Allotype-locality: Manhattan, Kansas.

Type: Female with the following data: "Stafford Co. Ks. VI-30-'34 D. A. Wilbur Salt Marsh." In the collection of Professor Wilbur at Kansas State College.

Allotype: Manhattan, Kansas, IV-19-'30, D. A. Wilbur. From pasture variety plots at the Agronomy Farm, Kansas State College. In the collection of Professor Wilbur.

Paratypes and their location in collections as follows:[2]

2 (KS)—Kansas State College, Manhattan, Kansas. (Kan.)—University of Kansas, Lawrence, Kansas. (KSW)—Collection of Professor D. A. Wilbur, Manhattan, Kansas. (USNM)—U. S. National Museum, Washington, D. C. (RDS)—the author's collection.

KANSAS

Douglas Co.: X-10-1933 H. M. Smith 1 female (KS).

Riley Co.: V— Marlatt 1 female (KS). IX-6—J. B. Norton Ac. 1328 1 male (KS). IX-6—E. E. Faville 1 female (KS). IX-24—E. E. Faville 1 female (KS). IX-28—E. E. Faville 1 female (RDS). IX-29—E. E Faville 1 female (KS). X-1—E. E. Faville 1 female (KS). X-6—E. E. Faville 1 male (RDS).

Manhattan—all collected by D. A. Wilbur.

V-2-1930 on mixture of grasses 1 male (Kan). VII-19-1930 on white clover 1 female (KSW). VIII-1-1930 on Brome and orchard grass mixture 1 male (KSW). VIII-23-1930 1 male (KSW). VIII-29-1930 on timothy 1 male (RDS). VIII-29-1930 1 female (KSW). IX-15-1930 on Sainfoin 1 male

(KSW). IX-19-1930 1 female (KSW). IX-27-1930 on crested wheat grass 1 female (KSW). IX-27-1930 on timothy 1 female (KSW), 1 female (RDS). IX-27-1930 on tall oat grass 1 female (RDS). IX-27-1930 on Sainfoin 1 female (KSW). X-3-1930 on upland native grasses 1 female (KSW). XI-1-1930 on upland native grasses 1 female (KSW). XI-11-1930 on upland native grasses 1 female (KSW). V-26-1933 on upland native grass pasture 1 male (KSW). VI-28-1933 on upland native grass pasture 1 female (KSW). IX-17-1933 on upland native grass pasture 1 male (KSW). V-5-1934 on Brome-Orchard grass mixture 1 male (USNM). V-7-1934 on Kentucky blue grass pasture 1 male (Kan). IX-23-1934 on Brome-Orchard grass mixture 1 male (KSW). VIII-26-1935 on upland native prairie grass pasture 1 male (KSW). X-19-1936 on upland native prairie grass pasture 1 female (Kan.). VII-8-1937 on upland native prairie grass pasture 1 male (KSW). VIII-28-1937 Kentucky blue grass pasture 1 female (KSW). VIII-30-1937 on upland native prairie grass pasture 1 female (KSW). IX-14-1937 on upland native prairie grass pasture 1 female (USNM), 1 female (RDS).

MICHIGAN

Cheboygan Co.: VII-9-1934 M.D.P., Colr. 1 male (KS).

THE GENUS ILYOCORIS STAL
(Hemiptera, Naucoridae)

ROBERT L. USINGER
University of California, Davis

Ilyocoris cimicoides (Linnaeus) is one of the best known European water bugs. The name is frequently given as **Naucoris cimicoides** but Stal (1861) and others have shown that Geoffroy (1762) misidentified the Fabrician **maculatus** as **cimicoides** when he first proposed the genus **Naucoris.** Hence **Naucoris** is restricted to **maculatus** and its allies and Stal's genus **Ilyocoris** must be used for **cimicoides.**

In **Ilyocoris** the front femora are only moderately incrassate with their inner antero-basal angles not produced, forming a continuous curve with the trochanter. The upper front margin of each femur is evenly pubescent throughout its length. The species of **Ilyocoris** range from 11 to 16 mm. in length.

Naucoris has tremendously incrassate front femora with the inner antero-basal angle well separated from the small trochanter. This angle bears a dense mat of hairs and the upper front margin of the femur is not pubescent. The **Naucoris** species are relatively small, never exceeding 10 mm. in length.

Naucoris is widespread in the Old World with species described from the southern Palaearctic region and from the Ethiopian, Oriental and Aus-

tralian Realms. **Ilyocoris**, on the other hand, is exclusively Palaearctic. **Cimicoides** has been recorded from England to Manchuria and from Sweden and Siberia to Italy and Turkestan (Oshanin, 1906, and Kiritshenko, 1930).

Lindberg (1922) described the "variety" **jonicus** from the Island of Corfu. **Jonicus** is said to differ only in its smaller size, **cimicoides** being from 12 to 14 mm. in length whereas **jonicus** is only 11½ mm. This would appear to be a rather trivial difference considering the range of variation in certain American **Naucorids** but, if constant, would certainly indicate a geographically isolated subspecies. Corfu is just below the fortieth parallel of latitude and this line coincides fairly well with the southern limits of distribution of typical **cimicoides**.

Closely allied to **cimicoides** at the eastern limits of its range is the Japanese **exclamationis** Scott. Although well known in Japan (Esaki, 1932) this species has not been carefully studied in relation to the rest of the Palaearctic fauna. It was unknown to Stal (1876) who listed it under "**Species Naucoridarum incerti loci systematici.**" That it is not restricted to the Japanese islands is indicated by two specimens collected by E. C. Van Dyke at Nanking, China, Sept. 27, 1923. These agree perfectly with a specimen in my collection from Fukuoka, Kyushu, Japan, April 30, 1929, collected by Fujino and Matsuo. **Exclamationis** differs from typical **cimicoides** in its smaller size, 11 to 11½ mm. and in its differently colored embolium, the entire basal two-thirds being pale whereas only the lateral margins are pale in **cimicoides**. Here again we have very trivial differences and **exclamationis** occurs south of the fortieth parallel of latitude. Its status as a species or subspecies may be settled by an investigation of the **Ilyocoris** population along the fortieth parallel north of Nanking and south of Harbin, for Dr. Hungerford has recently sent two perfectly typical specimens of **cimicoides** from the Valley of the Ashiko River near Harbin, Manchuria, "under thin ice," Nov. 1-2, 1938, M. J. Nikitin.

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NOTES ON OKLAHOMA BOT FLIES

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The damaging effects of this group of insects have been recognized for a long time, however the bionomics and controls, continue as problems of much controversy. The purpose of this paper is to present the heretofore unpublished records of specimens present in the Entomological Museum of Oklahoma A. and M. College, and some observations made by the authors on the bionomics of one species. All information, except where noted, is from adult material identified by David Hall and S. W. Bromley, to whom the writers are indebted for the determinations.

Family Gasterophilidae

Gasterophilus intestinalis (DeGeer) (**G. equi** (Clark). Wells and Knipling (1948) found that this was not the most abundant species present in the horses dissected in Illinois and Iowa, as had been expected. It is represented in the collection by: five specimens, Stillwater, July 21, 1930 (H. Whitaker); two specimens, Stillwater; September 23, 1933 (R. Dahms); and one specimen from each of the following localities; Stillwater, September 21, 1931 (H. Whitaker); Cushing, June 15, 1932 (W. D. Davis); and Woodward, August 13, 1932 (W. D. Davis).

Gasterophilus nasalis (Linn.) (**veterinus** (Clark)) Contrary to popular opinion, Wells and Knipling (1938) found this to be the most abundant species in the vicinity of Ames, Iowa. It is apparently rare in Oklahoma, if the records serve as an adequate index; being represented by one specimen from Stillwater, October 25, 1934 (C. A. Sooter), one from Farris, November 5, 1934 (C. E. Sanborn), and one from Tulsa, April 28, 1938 (L. Harris).

Gasterophilus inermis Brauer. This species is apparently rare in Oklahoma. There is one specimen from Stillwater, May 14, 1932 (W. D. Davis) present in the collection.

Family Oestridae

Hypoderma lineata (de Villers). This species has often been confused with **H. bovis** (DeGeer), the two being of much economic importance in cattle, however, the latter species is not represented in the collection. The former species is represented as follows; Stillwater, April 13, 1936 (K. C. Davis); Perkins, April 17, 1932 and Stillwater, March 16, 1932 (M. L. Costner); and Stillwater, March 23, 1932 (W. D. Davis), each collection being represented by one specimen.

Family Cuterebridae

Cuterebra cuniculi (Clark). As is the case with all members of this family, this species is very rare. It has a wide distribution in the United

States, and published records show that its larvae are the most common bots to be found in rabbits in the Eastern States. It is represented by one specimen collected at Stillwater, May 15, 1932 (H. Whitaker).

Cuterebra (Bogeria) buccatta (Fab.) Painter (1930) lists this as being more common than **C. cuniculi** in Kansas. This in addition to the observations by the authors would suggest that this species is more prominent in the Middle West than in the Eastern States.

For a period of one year, January 1, 1939 to January 1, 1940, periodical collections of the cottontail rabbit **Sylvilagus floridanus alcer** (Bangs)), were made at Stillwater, Oklahoma, totaling 197 rabbits for the year. Each month at least 5 and no more than 32 rabbits were collected; of this number, 6 were found to be harboring warbles. Five of the nineteen animals examined in June were found to be infested with these parasites; three larvae being removed from one rabbit. The sixth parasitized rabbit was taken on November 21. The specimens taken in June were found in the scrotum, while the one collected in November, was removed from the region of the loin.

The larvae taken June 11 were placed in moist sand at ordinary room temperature, and two flies emerged on August 25, one male and one female. They were identified by the authors as **Cuterebra (Bogeria) buccatta** (Fab.). The attempt to rear the last specimen was unsuccessful. The pupation period was close to, but no more than 74 days. One adult is present in the museum taken at Stillwater, September 10, 1930 (H. Whitaker). It is rather unfortunate that no work on the biology could be done during this period, since very little is known of the group.

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NOTES

NEW KANSAS LEPIDOPTERA RECORDS

William D. Field in his "Manual of the Butterflies and Skippers of Kansas" (Bulletin of The University of Kansas, Dept. of Entomology, No. 12) suggests that species of the genus **Megathymus** (Scudder) should be found in Kansas. The writer and his wife along with Dr. and Mrs. R. C. Turner, Jr., and Mr. and Mrs. Harry E. Jenista on Feb. 28, 1943, discovered **Megathymus** larvae in the plant **Yucca glauca**, near Caldwell in Sumner County, Kansas. Later in the season pupae and imagines were taken in Kansas and Oklahoma. These specimens were recognized as a new subspecies of **Mega-**

thymus yuccae and were described by H. A. Freeman (Entomological News, 44, No. 9, Nov. 1943) under the name of **Megathymus yuccae stallingsi**; a female form of this subspecies was named **dee**. Type locality of this new subspecies and form is Caldwell, Kansas, and the colony is located at the base of Mt. Lookout on the south bank of Bluff Creek.

A stray specimen of **Strymon leda** (Edw.) was captured in Sumner County this past season.

A series of **Asterocampa clyton texana** (Skin.) was collected by us in Sumner County, Kansas, in 1943. It appears to be native.

—Don B. Stallings, Caldwell, Kansas.

THE FOOD PLANTS OF ADELPHOCORIS LINEOLATUS, GOEZE

Curtiss (this **Journal** 14:25-26, 1941) has remarked that I referred to **A. lineolatus** as the "chrysanthemum bug" in 1915. This was a translation of the name "la punaise du chrysantheme" used for **Calocoris chenopodi** (a synonym of **A. lineolatus**) by Truffaut in "Les ennemis des plantes cultivees," p. 391 (Versailles, 1912).

Mr. F. Laing of the Department of Entomology of the British Museum informs me that according to the records there, the distribution of this insect is South Russia and Asia, with food-plants as follows:

Chrysanthemum, beet, lucerne, onion, cotton, mallow, **Salvia, Verbascum, Chenopodium, Euphorbia, Artemisia, absintheum, Eringerum,** and **Carduus.**

To these may be added gooseberry (R.A.E. 3:458) and buckwheat (4:479).

—C. J. Golledge, F.R.E.S., London, England.

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